DOCUMENT RESUME

ED 478 258 EA 032 631

AUTHOR	Chance, Patti L.; Anderson, Robert B.
TITLE	The Principal's Role in Standards-Based Reform: Linking Accountability to Instructional Improvement.
PUB DATE	2003-04-00
NOTE	41p.; Paper presented at the Annual Meeting of the American Educational Research Association (Chicago, IL, April 21-25, 2003).
PUB TYPE	Reports - Research (143) -- Speeches/Meeting Papers (150)
EDRS PRICE	EDRS Price MF01/PC02 Plus Postage.
DESCRIPTORS	Accountability; *Administrator Responsibility; *Administrator Role; Change Agents; Educational Administration; Educational Improvement; Instructional Improvement; *Instructional Leadership; *Principals; Science Education; Science Teachers; Secondary Education; Secondary School Science; *State Standards; *Teacher Administrator Relationship
IDENTIFIERS	*Nevada

ABSTRACT

In 1997, the Nevada Legislature enacted the Nevada Education Reform Act to implement standards-based reform in all academic subjects in Nevada's schools. The act required that both teachers and principals be engaged in the process. This report describes a study of secondary principals' and secondary science teachers' perceptions of the impact that the new science standards have had on six areas: (1) instruction; (2) curriculum; (3) assessment; (4) accountability; (5) professional development; and (6) supervision. Attention was focused on the instructional leadership activities of principals and what they did to ensure implementation of Nevada science standards. Data were collected through a questionnaire (analyzed using descriptive statistics and t tests) and telephone interviews (analyzed qualitatively through domain analysis). The sample consisted of 159 science teachers and 56 administrators. The results showed that perceptions of administrators and science teachers on the impact of Nevada science standards differed significantly in all six areas related to instructional leadership. Principals tended to view standards as having greater impact on curriculum and instructional practices than teachers did. Teachers and principals generally perceived that teachers, more than principals, are accountable for student achievement. Also includes a summary of questionnaire results in tabular form. (Contains 31 references.) (WFA)

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The Principal's Role in Standards-Based Reform: Linking Accountability to Instructional Improvement

Patti L. Chance
Department of Educational Leadership
University of Nevada Las Vegas
4505 Maryland Parkway, Box 3002
Las Vegas, NV 89154
(702) 895-1696
pbchance@ccmail.nevada.edu

Robert B. Anderson
Department of Educational Leadership
University of Nevada Las Vegas
4505 Maryland Parkway, Box 3002
Las Vegas, NV 89154
(702) 895-3491
rba1988@aol.com

Paper presented at the
American Educational Research Association Annual Meeting
Supervision and Instructional Leadership SIG
April, 2003
Chicago, Illinois

EA 032 631

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**The Principal's Role in Standards-Based Reform:
Linking Accountability to Instructional Improvement**

In the United States, major reform cycles constitute a recognizable dimension in the educational landscape (Murphy & Adams, 1998). Current school reform efforts focus on student performance by prescribing standards that each student must obtain (Tirozzi & Uro, 1997). The majority of states have enacted some form of standards-based reform. The 1997 Nevada State legislative session enacted the Nevada Education Reform Act (NERA) to implement standard based reform in all academic subjects in Nevada's schools. NERA created a panel known as the Nevada Council to Establish Academic Standards for Public Schools to develop high, measurable standards (Nevada Department of Education, 2000). Since that time, this council has established standards for all core academic subjects including Nevada science standards.

To be successfully implemented in Nevada, standards–based reform efforts require both teachers and principals to be engaged in the process. The purpose of this study was to describe secondary principals' and secondary science teachers' perceptions of the impact that new science standards have had on instruction, curriculum, assessment, accountability, professional development, and supervision. Attention was focused on the instructional leadership activities of principals and what they were doing to ensure the implementation of Nevada science standards.

Theoretical Framework

Principal's instructional leadership has been described as the link between effective teaching and student learning (Edmonds, 1982). Keefe and Jenkins (1984) described instructional leadership as "the principal's role in providing direction, resources, and support to teachers and students for improvement of teaching and learning in the school (p.7). Broadly, instructional leadership is concerned with instruction, assessment, accountability, professional development, curriculum, and supervision (Blase & Blase, 1999; Bossert, Dwyer, Rowan, & Lee, 1982; Gantor, Daresh, Dunlap, & Newsome, 1999; Glickman, 1985; Pajak, 1989).

Standards-driven reform requires change in how principals and teachers work. Anderson (1996) stated that the principal, as instructional leader, must provide the necessary resources to ensure the achievement of academic goals. Instructional leadership is critical to the successful implementation of standards. Instructional leadership and instructional supervision are essential elements for facilitating learning and promoting new, innovative school practices such as the Nevada science standards (Boyd, 1990; Edmonds, 1982; Harris, 1998; Martin, 1990). Principals influence student learning through their interaction with teachers and by shaping a school's organizational features (Hallinger, Bickman, & Davis, 1996). Anderson (1996) asserted that if principals are to guide the implementation of school science programs that reflect the intent of state standards, they must promote a climate that fosters shared responsibility for student success and ongoing assessment of curriculum and instruction. Cross

and Joftus (1997) implied that for teachers, standards-base reform requires content knowledge, appropriate evaluation of all students, and focus on instructional improvement. Effective and high achieving schools are dependent upon capable instructional leadership from the principal (Boyd, 1996).

Method

Perceptions of principals' instructional leadership and supervision activities related to the implementation of state-mandated science standards were investigated via questionnaires and interviews. Questionnaire data were analyzed using descriptive statistics and t-tests for testing significance of the difference between means (Gall, Borg, & Gall, 1996). Telephone interview data were analyzed qualitatively through domain analysis (Spradley, 1980). This mixed methodology approach provided the advantages of data triangulation and clearer identification of emerging complimentary phenomena (Creswell, 1994).

The Nevada Science Standards Questionnaire was developed based upon common, emerging themes from research on instructional leadership and specifically geared toward the goals of curriculum standards as articulated by the Nevada Council to Establish Academic Standards for Public Schools. The Nevada Science Standards Questionnaire reflected six interrelated constructs related to instructional leadership, soliciting responses about administrative actions and behaviors related to (a) instruction, (b) assessment, (c) accountability, (d) professional development, (e) curriculum improvement, and (f) instructional supervision. Two parallel forms of the Nevada Science Standards Questionnaire were developed, one designed for administrators and another for

science teachers. The questionnaire consisted of seven demographic questions and 49 items related to the implementation and effect of science standards on classroom practices. Items were designed to assess participants' perceptions of the effect of the standards themselves as well as the role that high school administrators play, as instructional leaders, in achieving the goals of this standards-based reform.

Questionnaires were distributed to science teachers and principals in all Nevada public high schools. The population consisted of 425 science teachers and 130 principals, representing 65 public high schools. These high schools were located in rural, suburban, and urban areas of the state. Forty-three high schools participated in the survey, establishing a school return rate of 66%. One hundred and ninety-five science teachers responded providing a return rate of 46% (195/425) and 56 administrators responded providing a return rate of 43% (56/130).

In addition to the questionnaire, a semi-structured telephone interview was constructed as a secondary means of collecting science teachers' and administrators' perceptions about the impact of Nevada science standards. Telephone interviews were conducted with randomly selected principals and teachers. Interviews were used as a means to triangulate data from the questionnaire and to provide more robust findings and in-depth description of science teachers' and administrators' perceptions.

Discussion of Findings

This study showed that administrators and science teachers' perceptions of the impact of Nevada science standards differed significantly in all six areas related to instructional leadership: (a) instruction, (b) assessment, (c) accountability, (d) professional development, (e) curriculum, and (f) supervision. The following discussion delineates two areas investigated in this study: (a) how teachers and administrators view the impact that the standards themselves have had on curriculum and instruction, student assessment, accountability, and professional development; and (b) how principals and teachers perceive administrative behaviors related to supervision and instructional leadership activities.

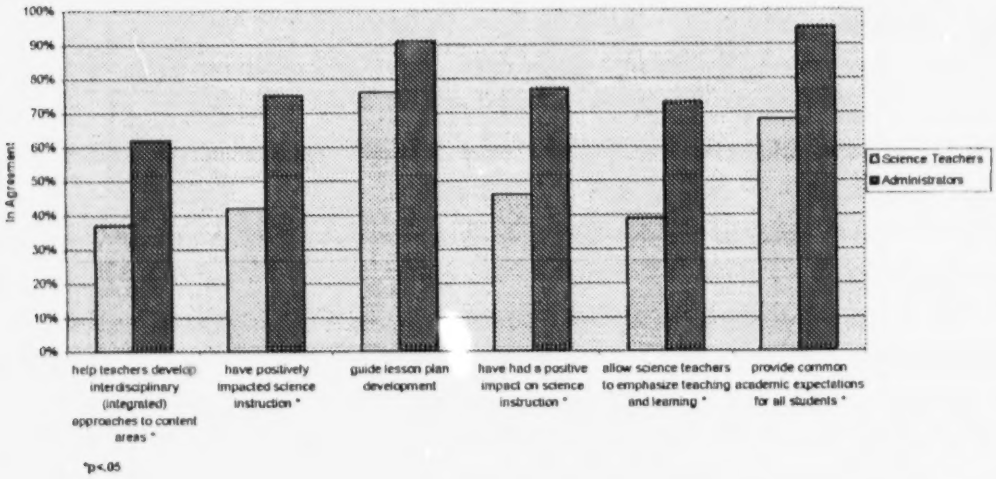
Impact of Standards

Instruction

Teaching the new standards, as the National Research Council (1996) stated, requires science teachers to plan inquiry-based science programs. In addition, science standards require substantial changes in how science is taught.

Five questionnaire items were related to the perception of science teachers and administrators regarding the impact of Nevada science standards on classroom instruction. Figure1 displays these results graphically. All items showed a significant statistical difference between science teachers and administrators except the items that asked if Nevada science standards guide lesson plan development.

Figure 1. **Percentage of Respondents Denoting Agreement or Strong Agreement Regarding Standards' Impact on Instruction**



*p<.05

Seventy-three percent or more of administrators responded favorably (agreed or somewhat agreed) to five of the questionnaire items related to instruction. These referred to science standards (a) positively impacting the science curricula, (b) providing common expectations, (c) guiding lesson plan development, (d) allowing science teachers to emphasize teaching and learning, and (e) providing common academic expectations for all students(item 33/95%). Sixty-eight percent or more of science teachers agreed or somewhat agreed that science standards guide lesson plan development and provide common expectations for all students.

Responding to the impact of Nevada science standards on instruction, administrators and science teachers perceived that Nevada science standards

do guide lesson plan development. One science teacher stated, "I've had to go back and use benchmarks and make sure my daily objectives are matching with science standards and curriculum goals" and another teacher added, "I think I copy the backward assessment model (BAM) quite a bit more..." Nevada science standards have affected how teachers plan their daily lessons. Although the daily lesson plans have been affected, science teachers and administrators differ regarding whether or not Nevada science standards have had a positive impact on science instruction. Forty-six percent of science teachers perceived a positive impact whereas 77% of administrators perceived a positive impact on instruction. A science teacher in a small, rural school suggested "It [Nevada science standards] has limited my personal freedom to teach...therefore in many ways has limited my choices of what I think is appropriate." In addition, a science teacher from a larger school noted, "Everyday I have to put corresponding numbers to go with standards. I hate it."

Nevada science standards seek to impact classroom instruction practices. However, the teacher interview data suggested that Nevada science standards do not encourage teachers to change their instruction. Science teachers indicated more concern over documenting standards than developing innovative instructional strategies. Thus, standards appear to promote paperwork over real change in the classroom. Supporting the interview assertions, 39% of responding science teachers agreed or somewhat agreed that Nevada science standards emphasized teaching and learning and 42% indicated that science standards have positively impacted science instruction.

In contrast to science teachers, administrators perceived Nevada science standards' impact on instruction more positively. Seventy-three percent of administrators responded favorably when asked if Nevada science standards positively impacted science instruction and emphasized teaching and learning. One administrator commented, "...I think what they've [Nevada science standards] done is made our curriculum a little more consistent across the board." Another administrator suggested "I would say that it has given science a little more focus...instead of hit or miss, it's a little more directed." This same administrator added, "Instructional methods would be the thing that has changed most. The idea of starting with a concept in mind and working backward towards it...is planning in the BAM model."

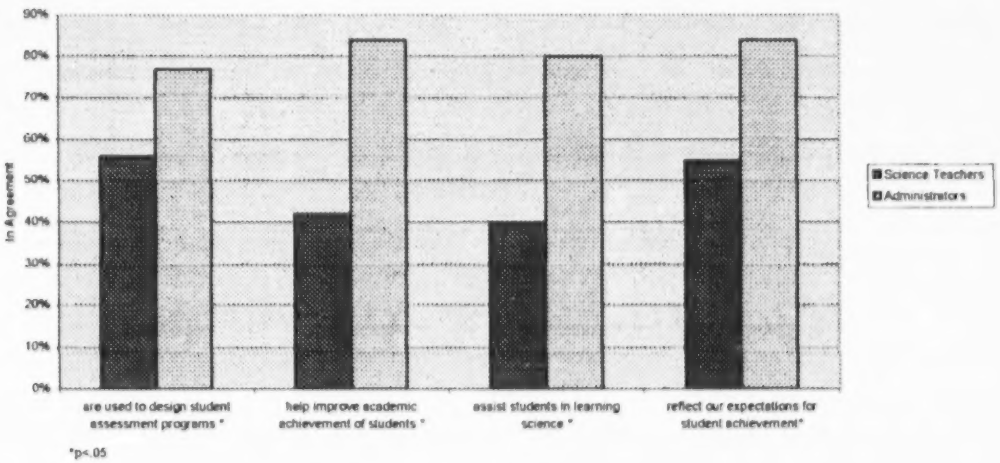
The National Science Teachers Association (1993) observed that the typical U.S. science program discourages real learning because the programs rely on fact and inhibits students from making real world connections. Standards have not relieved this dilemma. As Cohen and Ball (2001) implied, instruction consists of interaction between teachers, learners, content, and environments over time. Simply placing numbers in the margin of a lesson plan book will not change instruction. As the National Research Council (1996) suggested, reforming science education requires substantive changes in science instruction.

Assessment

Four questionnaire items were related the perception of science teachers and administrators regarding the impact of Nevada science standards on assessment. Figure 2 reflects these results. All four items showed a significant

difference between science teacher and administrator perceptions. Administrators' and science teachers' responses indicated that perceptions differed on whether or not Nevada science standards helped to improve academic achievement of students and assisted students in learning science.

Figure 2. **Percentage of Respondents Denoting Agreement or Strong Agreement Regarding Standards' Impact on Assessment**



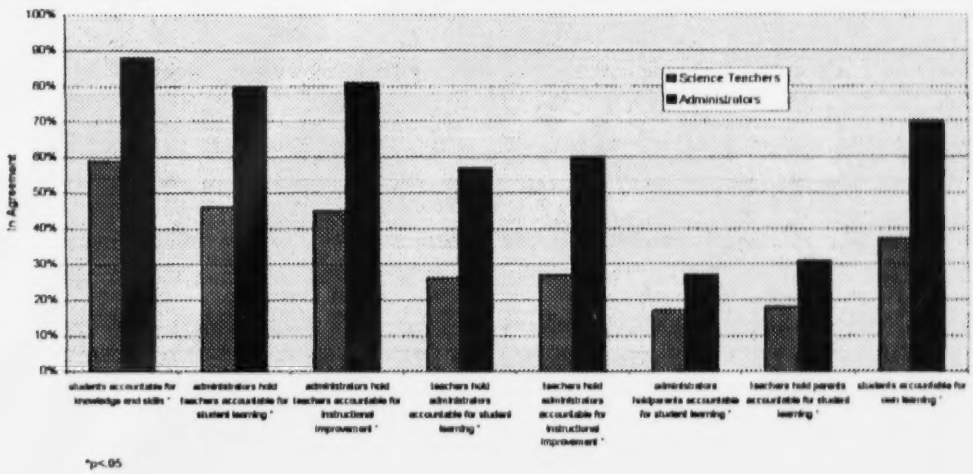
Administrator interviews indicated that they perceived science achievement in terms of students' performance on the state mandated science proficiency test. One administrator suggested "...they [science teachers] may be structuring their questions a little differently on their teacher made tests so they're [science teachers] a little closer in line with what would be on the state standardized test." Another administrator added "...teachers are still giving tests...still utilizing techniques that you use to determine what those kids are learning in the classroom. I'm not sure that testing assessment procedures have changed."

National science standards emphasize authentic assessment techniques that utilize laboratory-based inquiry to measure student understanding of scientific concepts (NRC, 1996). Nevada science standards attempt to do the same. However, one science teacher stated, "I think there's more emphasis on lab now, more performance lab. Maybe I am old fashioned, but I find lab to be especially time consuming since so much of the curriculum to be fact based. I find lab to be a very inefficient method for teaching that." Another teacher described standards-based assessment practices in a class for lower level students by stating, "They still get standards testing. They can use notes, worksheets, anything that we have worked on... I don't really give them quote-unquote homework due the next day because I won't get any back." These comments seem to be the antithesis of the national science standards goals (NRC, 1996), but do indicate that Nevada science standards provide common expectations to guide student assessment programs, at least toward the state proficiency examination. There apparently is confusion about what to assess and how to assess it within the classroom. As indicated by teacher and administrator comments, current student assessment practices seem to be traditional assessment practices, not novel approaches to assessment. An administrator noted, "I hate to see us have dictated everything they [teachers] do. It takes away a little bit of your freedom and a little bit of your spontaneity and that's not good."

Accountability

Eight items on the questionnaire addressed administrators' and teachers' perceptions of the impact of science standards on accountability. All questionnaire items showed significant differences between science teachers and administrators. Figure 3 illustrates science teacher and administrator responses to these items. The Nevada science standard questionnaire asked if science standards (a) assist administrators in holding parents accountable for student learning , and (b) assist teachers in holding parents accountable for student learning . Within the accountability category, these two items had the lowest frequency of favorable responses (either agree or somewhat agree) from administrators and science teachers as well as closest agreement between the two groups. Seventeen percent of science teachers and 27% of administrators agreed or somewhat agreed with the first item and 18% of science teachers and 31% of administrators agreed of somewhat agreed with the latter item. Parental accountability was the only item in the accountability category not to show a significant difference between science teachers and administrators. A science teacher stated that "Nevada science standards will not change anything about parent accountability issues."

Figure 3. **Percentage of Respondents Denoting Agreement or Strong Agreement Regarding Standards' Impact on Accountability**



*p<.05

Adherence to standards in response to accountability issues seemingly has curtailed teacher innovation and their emphasis on teaching and learning This could be in response to the accountability system that has been coupled with Nevada science standards. Currently, Nevada high school students are required to pass a standardized exam as a graduation requirement. By 2005, all Nevada science students are required to pass a science proficiency exam based on state standards as a graduation requirement. This accountability system may run counter to the intent of standards (Nevada Department of Education, 2000; NRC, 1996). When asked about the impact of science standards on their schools, two science teachers mentioned how well their students had performed on the state standardized test. Each administrator responded to the similar

question by suggesting that instruction, curriculum, and assessment practices in the classroom prepare students for this exam.

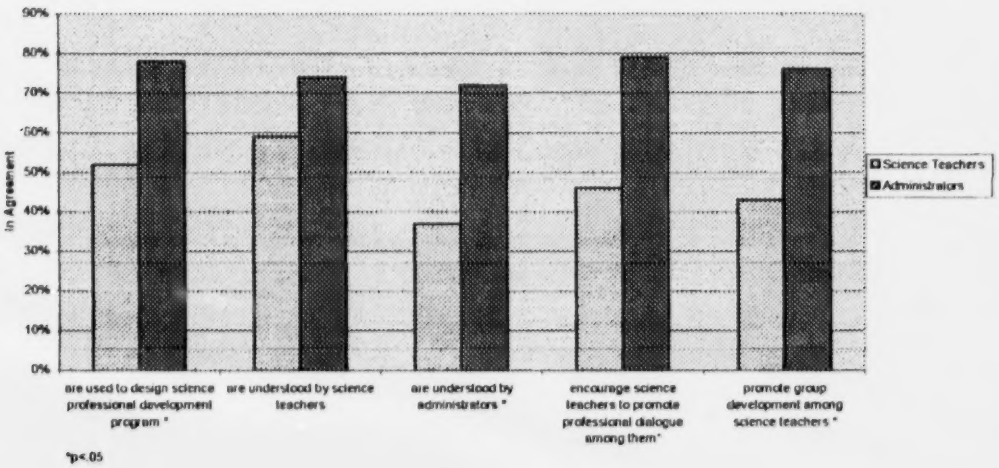
These individuals will be held accountable for the performance of their students on this exam. However, Adams and Kirst (1999) implied that such accountability measures "introduce internal contradictions that draw attention away from important accountability goals" (p.473). Accountability draws the focus from standards that improve teaching and learning to a focus on performance on state mandated exams. In essence, accountability has defeated the intention of standards. Instead of standards that promote classroom innovation and higher student achievement, standards become the means to meet an end. This end is measured by one high-stakes accountability test, the results of which are published for the public to draw conclusions about their local schools. This accountability system favors bureaucratic rules and regulations at the expense of real change within the classroom.

Professional Development

Five questionnaire items were related to the perception of science teachers and administrators regarding the impact of Nevada science standards on professional development. Figure 4 displays these results. All items showed a significant statistical difference between science teachers and administrators. The largest difference between science teachers and administrators perceptions in this category referred to Nevada science standards' impact on promoting group development among science teachers. Forty-three percent of science teachers responded favorably (agree or somewhat agree) while 86% of

administrators responded favorably to this item. In response to this item one administrator stated, "[What is good about Nevada science standards]...is just the collaboration between teachers working together. They're really getting together, discussing all their units, their plans..." The item regarding standards' impact on promoting professional dialogue among science teachers produced a large discrepancy between administrators and science teachers where 47% of science teachers and 79% of administrators responded favorably. An administrator suggested "It's [Nevada science standards] made a lot of dialogue between teachers." Another administrator added, "High schools are so compartmentalized. It is great spending time dialoguing with colleagues and getting together." In addition, item 13 demonstrated the closest agreement between science teachers and administrators perceptions regarding science standards impact on professional development programs. This item elicited a favorable response from 51% of science teachers and 78% of administrators.

Figure 4. **Percentage of Respondents Denoting Agreement or Strong Agreement Regarding Standards' Impact on Professional Development**



In order for teachers to change instruction, there must be a thorough understanding of what the standards imply. This requires equally substantive change in professional development practices at all levels. According to the National Research Council (1996), "[Teachers] should be provided opportunities to develop theoretical and practical understanding and ability, not just technical proficiencies" (p. 5).

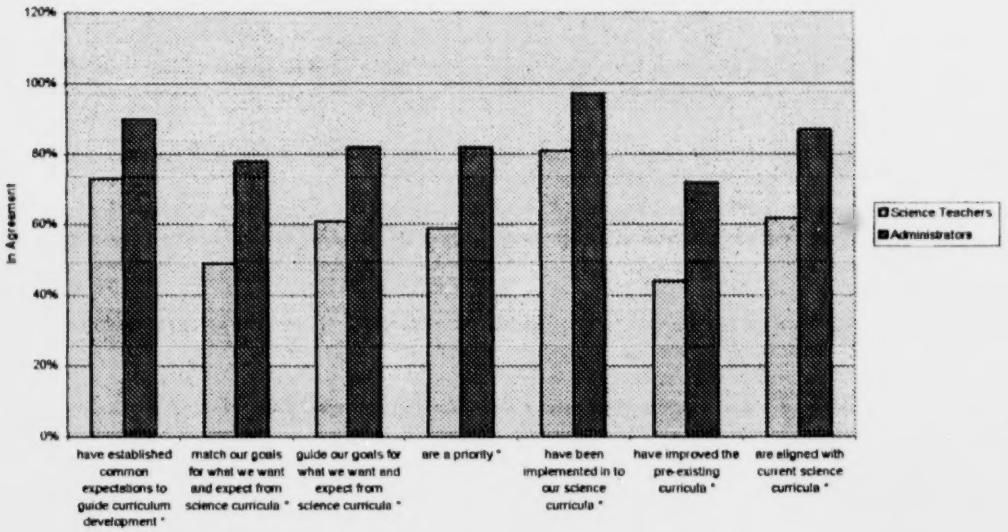
Thus, time is viewed as a critical component to instructional improvement (Cohen & Ball, 2001; NRC, 1996). As indicated by interview data, time was provided for professional development at Nevada high schools. For example, one administrator commented, "We spent a whole day over with feeder middle school where we met with and worked with our...teachers and theirs for a full day. Discussed what our scores and needs were and what their scores and

needs were. Looking at our students and trying to figure out what different trends we were seeing and working on what seemed to be missing. We did a lot. The day was wonderful. The teachers said it was the best day ever spent as far as staff development." However, one or two days spent over the course of a school year discussing curriculum and talking to colleagues is inadequate. Pajak (1993) observed that professional development is the most important aspect of instructional leadership.

Curriculum

Seven items focused on science teachers' and principals' perceptions regarding the impact of Nevada science standards on curriculum. Figure 5 illustrates these responses. All questionnaire items demonstrated a significant difference. Seventy-two percent of science teachers and 88% of administrators agreed or somewhat agreed with the item that suggested standards provide a guide for curriculum development at their school. In addition, 15% of science teachers responded neutral to this question item. Forty-nine percent of science teachers perceived that Nevada science standards match their goals for what they want and expect form science curriculum, whereas 78% of administrators responded favorably. However, a higher frequency of science teachers, 61%, agreed or somewhat agreed that science standards guide what they want and expect from their science curriculum, and 81% of administrator responded positively (agreed or somewhat agreed) to this question.

Figure 5. **Percentage of Respondents Denoting Agreement or Strong Agreement Regarding Standards' Impact on Curriculum**


120%
100%
80%
60%
40%
20%
0%
In Agreement
Science Teachers
Administrators
have established common expectations to guide curriculum development *
match our goals for what we want and expect from science curricula *
guide our goals for what we want and expect from science curricula *
are a priority *
have been implemented in to our science curricula *
have improved the pre-existing curricula *
are aligned with current science curricula *

When asked if science standards improved the pre-existing curricula, one science teacher responded, "It [Nevada science standards] definitely gave it direction." An administrator proposed that "...they have [Nevada science standards] made our curriculum more consistent...across the board." Several schools indicated modifying their curriculum in response to Nevada science standards. Another science teacher noted, "We've totally restructured our science program in that we're on block schedule."

The Nevada Education Reform Act stated that Nevada science standards would provide common expectations to guide instruction. Science teachers and administrators agree that it does. However, as applied to Nevada classroom instruction, teachers perceive standards dissolve their autonomy as

professionals. In addition, all interviewees mentioned that lesson plans were guided by being benchmarked to local curricula and Nevada science standards. Placing numbers in a lesson plan book does not constitute an innovative approach to instruction, aimed at improving student achievement. In fact, this demonstrates the confusion between curriculum alignment issues and instructional approaches by science teachers. In supporting this assertion, 59% of science teachers indicated understanding science standards, compared to 75% of responding administrators. This apparently piecemeal approach to standards-based instruction violated what national science standard documents defined as standards based instructional improvement (NRC, 1996). Change toward standards-based instruction requires changes in assessment methods.

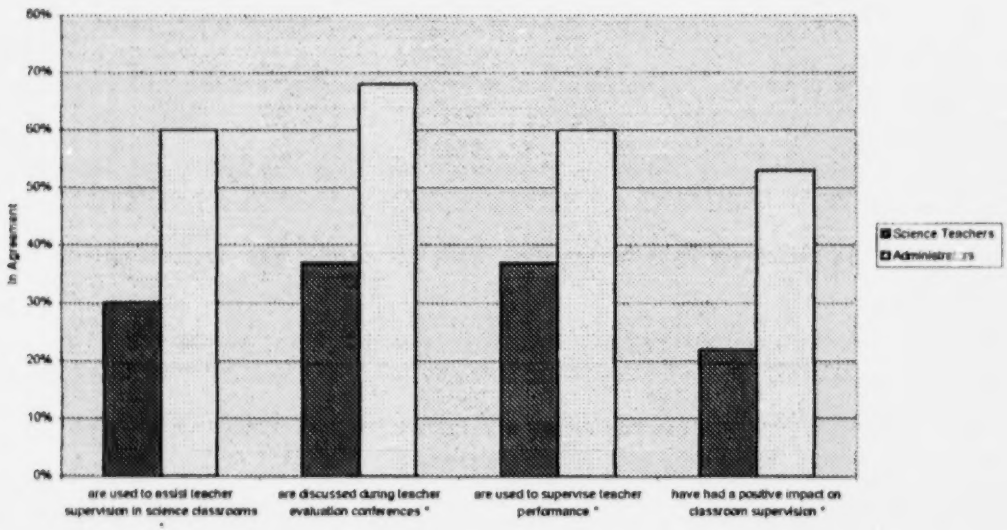
Principal Behavior

In addition to gathering data related to teachers' and administrators' perceptions of the impact of the standards themselves, the Nevada Science Standards Questionnaire asked respondents to react to items related to principals' instructional leadership and supervisory behaviors directly linked to the implementation of science standards in the curriculum and classroom instructional practices. The concept of instructional leadership was defined as "the principal's role in providing direction, resources, and support to teachers and students for improvement of teaching and learning in the school" (Keefe & Jenkins, 1984, p.7).

Figure 6 graphically illustrates administrators' and science teachers' response frequencies to the questionnaire items related to supervision. Each

supervision questionnaire item revealed a significant difference between administrators and science teachers' perceptions. Less than 37% of teachers responded favorably (agreeing or somewhat agree) that science standards (a) assist classroom supervision, and (b) are discussed during evaluation conferences, whereas 60% or more of administrators responded positively to these items. In addition, 45% or more of responding science teachers either disagreed or somewhat disagreed with these items.

Figure 6. **Percentage of Respondents Denoting Agreement or Strong Agreement Regarding Standards' Impact on Supervision**



One teacher, when asked if science standards are discussed during evaluation conferences, responded, "No." Another science teacher added, "Two years ago on my evaluation in the needs to improve section the individual [administrator] had stated to make sure that 'you're covering state and district standards.' Well, the problem is...that is a great thing to say, fine. Have you

[administrator] asked me? You [administrator] have not. Had you [administrator] looked in my lesson plan you [administrator] would have seen a copy of the curriculum that is based on standards and a check next to each state standard that were [sic] taught."

Table 1 depicts the activities in which Nevada's principals perceived they are involved to implement Nevada science standards. In addition, this table shows science teachers' perceptions of instructional leadership behaviors demonstrated by their principal at their school.

Table 1. Instructional Leadership Results Summary

Item Description	Science Teachers					Administrators				
I... (for administrators) The administrator... (for teachers) (and science teachers)	% A	% SA	% N	% SD	% D	% A	% SA	% N	% SD	% D
work (s) collaboratively (with science teachers) implementing Nevada science standards *	12%	27%	20%	19%	22%	38%	33%	22%	6%	2%
encourage(s) teachers' reflective behavior (i.e., planning more carefully, responding to student diversity) *	16%	35%	21%	15%	14%	39%	52%	5%	4%	0%
support(s) collaborative efforts among all science educators *	34%	37%	21%	5%	4%	64%	36%	0%	0%	0%
promote(s) professional growth among science teachers *	28%	31%	28%	7%	6%	55%	36%	7%	2%	0%
promote(s) professional dialogue among science educators *	25%	36%	21%	11%	7%	61%	36%	4%	0%	0%
talk(s) to teachers to promote reflection *	11%	27%	27%	22%	13%	43%	41%	16%	0%	0%
invite(s) science teachers to talk openly and frequently about science instruction *	16%	32%	24%	17%	12%	45%	45%	11%	0%	0%
emphasize(s) teaching and learning in the science classroom *	29%	36%	16%	12%	8%	62%	36%	2%	0%	0%

Table 1 (continued)

encourage(s) science teachers to take risks (i.e., different instructional strategies, alternative assessments, etc.	18%	28%	27%	15%	11%	54%	29%	11%	7%	0%
dialogue(s) openly and frequently with science teachers about science instruction *	10%	24%	26%	21%	19%	27%	39%	27%	5%	2%
make(s) suggestions about science lessons *	3%	19%	20%	25%	33%	21%	39%	25%	9%	5%
provide(s) opportunities for peer connections among teachers *	9%	28%	30%	19%	14%	38%	46%	11%	5%	0%
provide(s) feedback about science instruction. *	8%	26%	24%	18%	24%	34%	50%	14%	2%	0%
Solicit teachers' advice and opinions about classroom instruction. *	13%	27%	20%	19%	21%	52%	43%	5%	0%	0%
support(s) science teachers' efforts for classroom innovation *	24%	35%	25%	8%	9%	70%	29%	2%	0%	0%

*$p<.05$

Significant differences were found between science teachers' and administrators' responses for all questionnaire items except that item which asked if administrators encourage science teachers to take risks.

Administrator responses indicated that the majority perceived that they were active in the functions that define instructional leadership. Eight of the 14 questionnaire items had a 90% or higher favorable (either agree or somewhat agree) response frequency for participating administrators. These results indicate that administrators perceive themselves (a) encouraging teachers' reflective behavior, (b) supporting collaboration efforts among all science teachers, (c) promoting professional dialogue among science teachers, (d) promoting professional growth among teachers, (e) inviting science teachers to

talk openly about science instruction, (f) emphasizing teaching and learning in the science classroom, (g) soliciting teachers' advice and opinions about classroom science instruction, and (h) supporting science teachers' efforts for classroom innovation. These items describe facilitating behaviors, indicating that leaders are encouraging teachers to take primary responsibility for implementing standards in science classrooms.

Responses to items describing collaborative interaction and dialogue between administrators and teachers suggest that principals are less engaged in these types of supervisory behaviors. Items denoting collaboration and dialogue asked respondents about the following administrative behaviors: (a) makes suggestions about science lessons; (b) dialogues openly and frequently with science teachers about science instruction; (c) works collaboratively with science teachers to implement standards; (d) talks to teachers to promote reflection; (e) provides feedback about science instruction; and (f) solicits teachers' advice and opinions about classroom instruction. Responses denoting agreement with five of six items related to collaboration were the lowest ranked among both teachers and administrators. Administrators perceived themselves more positively than did teachers regarding administrators soliciting teachers advice and opinions about classroom instruction.

Instructional leadership is inextricably tied to the issues of supervision, instruction, professional development, curriculum, assessment, and accountability. In fact, each of these constructs is essential to the tasks of instructional leadership. Regarding supervision, Sergiovanni (1985) noted that

the theoretical perspectives of supervision do not fit the realities of supervisory practice. Sergiovanni (1985) argued that these theoretical perspectives "favor abstract views and deterministic prescriptions that do not reflect the actual world of supervision, and therefore are not very useful in and of themselves" (p.17). Zepeda and Ponticell (1998) further stated that traditionally supervision has been confused with evaluation, a function aimed at determining continued employment. Levin, Hoffman, and Badiali (1987) found that supervision was most helpful for teachers when teachers understood that the supervision process was intended to assist them in the improvement of teaching, when teachers and administrators jointly identified changes needed in instruction, and when administrators understood teachers' instructional objectives.

Based on the interview and questionnaire data collected, supervision in Nevada's high schools is practiced, as Reitzug (1997) suggested, as discrete interventions that begin and end at a particular time and that are imposed on teachers. These discrete interventions include a pre-evaluation conference at the beginning of the school year and subsequent classroom visitation. These practices illustrate the confusion between practices of supervision and evaluation among principals and the dominance of evaluation over supervision. Supervision is practiced as a "to do" list, not as a continuous process in schools.

One administrator indicated that, "[Nevada science standards] it's not a big part of the evaluation yet." Also, supporting Reitzug's (1997) assertion, another administrator added, "I would say more than anything else during pre-observation conferences at the beginning of the year when we're talking to

teachers about curriculum that's the time we talk about standards and how they're doing that. After that the evaluation is more about what is happening in the classroom, classroom discipline, classroom management, lesson plans..." Standards seemingly are treated as discrete units that have no direct affect on classroom practice. Interviews with both administrators and science teachers indicated supervisory practices focus on evaluation and summative functions as opposed to a process to enhance teaching and learning.

Conclusions

Fletcher (1998) asked the following rhetorical question about state mandated standards: "Will change follow in the classroom?" This study would suggest that change has not necessarily followed state mandated standards. One administrator noted that standards have "brought us all together and we're on the same page so to speak. I don't know if we weren't doing that before then, but at least now we know we're doing it." However, data from this study suggest that teachers and administrators were not "on the same page." Results from this study indicated that administrators and science teachers have a different frame of reference regarding the impact of science standards in Nevada high schools.

Principals tended to view standards as having greater impact on curriculum and instructional practices than did teachers. However, teachers and principals generally perceived that teachers, more than principals, are accountable for student achievement. Responses from science teachers indicated they were more concerned with the paperwork and aligning their lesson plan books with the curricula than with innovative teaching practices to enhance

student learning. Accountability mandates associated with standards-based curriculum have placed undue emphasis on compliance with bureaucratic rules and regulations rather than changing and improving instructional practices within the classroom. As Adams and Kirst (1999) noted, accountability systems set up tensions that limit creativity and innovativeness. Innovativeness and creativity, combined with the freedom to fail, are important conditions if change is to occur according to Zepeda and Ponticell (2001). However, accountability does not allow individuals to experiment, to take risks, or to fail, assuring that no change occurs within classrooms occur. Thus, the current accountability system stifles the goals of the standards.

If accountability mandates can suppress creativity and freedom, what is the principal's role in supporting instructional change in the classroom? This study found that administrators perceived their behaviors to be more supportive of teacher collaboration and more encouraging of dialogue than did teachers. Sergiovanni and Starratt (1998) pointed out that identical behavior can have different meanings to different people and in various contexts. They further noted that how teachers interpret administrative behavior is important to understanding the underlying assumptions that motivate behavior. Assuming that administrators' and teachers' responses are truthful reflections of how they perceive leadership behavior, there is an unmistakable mismatch between intent and perception. What principals see as leading, coaching, encouraging, and supporting is not viewed that way by teachers.

Differences between teachers' and administrators' perceptions about leadership behavior may be due to the different roles played by administrators and science teachers. Principals focus on the entire school, not just on the science instruction and curriculum. As one administrator stated, "Science standards are no more important to my school than English or math standards." This comment suggested that principals practice a holistic approach to school leadership. Science represents only one of many of the facets of a school's academic program. Administrators need not concern themselves about the minutiae of science standards. These individuals perceived that they simply need to place standards into the hands of science teachers, provide a few professional development opportunities, and standards will take care of themselves.

A lack of conversation about instruction may also help explain this difference in perceptions. Both administrators and science teachers stated that standards were discussed during the evaluation process. However, this discussion focused on the summative portion of the supervision process, and from data obtained in this study represented the only dialogue between a science teacher and an administrator about science standards and their impact. Zepeda and Ponticell (2001) describe this type of supervision as a meaningless/invisible routine--a shallow and a hollow ritual where neither the supervisor nor the teacher are invested and from which nothing meaningful or useful resulted (p.79). In this regard, administrators and science teachers are accomplices in a meaningless state mandated evaluation process.

The lack of intellectual dialogue between these participants equates to an absence of promoting a process for change within a school. Sergiovanni and Starratt (1998) discussed that a feeling of community needs to be in place before change can occur and an effective school is established. This is based on the collegiality that can only occur in a caring and collaborative environment. Personal contacts by principals during supervisory practice shape the environment they have with teachers (Sergiovanni & Starratt, 1998). As currently practiced in Nevada high schools, supervisory practices are disjointed and do not enhance teaching and learning. Reitzug (1997) referred to this as piecemeal supervision, where tasks associated with supervision are accomplished in a "to do" list manner as opposed to being an ongoing process within the school and the classroom.

Implications for Practice and Further Research

While this study found disparities between teachers' and administrators' perceptions of the impact of standards and principals' instructional leadership associated with standards-based curriculum reform, principals in this study believed that standards are making a difference in classrooms and with students. Principals' responses indicate that they believe that their instructional leadership behaviors were promoting professional development and collaboration among teachers for curriculum improvement. Yet, teachers were not so enthusiastic in their agreement with either of these notions.

Several questions emerge from this study which have implications for administrative practice.

- Did principals assume too much about teachers' readiness to take leadership roles in the curriculum and instructional change process?
- Were principals attending to the developmental needs of teachers (Glickman, Gordon, & Ross-Gordon, 2001)?
- Were principals building teachers' leadership capacity through continued knowledge and skill development (Sergiovanni & Starratt, 1998)?
- Were principals delegating too many facets of curriculum and instructional change to teachers too quickly?
- Were principals allowing bureaucratic mandates, such as accountability reporting, to deflect their attention from instructional leadership?

Data from this study cannot decisively answer these questions. However, principals who want to promote standards-based curriculum reform, instructional improvement, and teachers' professional development and collaboration in face of political pressures for accountability should reflect carefully upon their own leadership behaviors relative to these questions.

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Instruction Results Summary

Item Description	Science Teachers					Administrators				
At my school, I believe Nevada science standards...	% A	% SA	% N	% SD	% D	% A	% SA	% N	% SD	% D
# 17* help teachers develop interdisciplinary (integrated) approaches to content areas.	11%	26%	23%	24%	16%	21%	41%	23%	9%	5%
# 22* have positively impacted science instruction.	12%	30%	29%	16%	13%	25%	50%	20%	2%	2%
#25 guide lesson plan development.	31%	45%	13%	8%	3%	27%	64%	7%	2%	0%
#27* have had a positive impact on science instruction.	13%	33%	27%	15%	13%	26%	51%	24%	0%	0%
#29* allow science teachers to emphasize teaching and learning.	10%	29%	27%	16%	18%	27%	46%	23%	4%	0%
#33* provide common academic expectations for all students.	28%	40%	16%	9%	8%	45%	50%	2%	4%	0%

*$p < .05$

Assessment Results Summary

Item Description	Science Teachers					Administrators				
At my school, I believe Nevada science standards...	% A	% SA	% N	% SD	% D	% A	% SA	% N	% SD	% D
# 10* are used to design student assessment programs.	16%	40%	24%	16%	5%	27%	50%	15%	6%	2%
# 16* help improve academic achievement of students.	11%	31%	24%	20%	15%	35%	49%	15%	2%	0%
#32* assist students in learning science.	9%	31%	23%	23%	15%	16%	64%	13%	7%	0%
#34* reflect our expectations for student achievement.	19%	36%	20%	16%	8%	41%	43%	9%	5%	2%

*p<.05

Accountability Results Summary

Item Description	Science Teachers					Administrators				
At my school, I believe Nevada science standards...	% A	% SA	% N	% SD	% D	% A	% SA	% N	% SD	% D
# 2* assist in holding students accountable for developing certain knowledge and skills.	25%	34%	17%	16%	9%	34%	54%	9%	4%	0%
# 3* assist administrators in holding teachers accountable for student learning.	22%	24%	31%	15%	9%	32%	48%	13%	7%	0%
#4* assist administrators in holding teachers accountable for instructional improvement.	19%	26%	32%	15%	9%	38%	43%	16%	4%	0%
#5* assist teachers in holding administrators accountable for student learning.	11%	15%	24%	22%	28%	26%	31%	24%	11%	9%
#6* assist teachers in holding administrators accountable for instructional improvement.	11%	16%	25%	21%	27%	31%	29%	22%	15%	4%
#7 assist administrators in holding parents accountable for student learning.	6%	11%	20%	20%	43%	9%	18%	26%	24%	24%

Accountability Results Summary (con't)

#8* assist teachers in holding parents accountable for student learning.	5%	13%	18%	22%	43%	9%	22%	22%	22%	26%
#9* assist students in holding themselves accountable for student learning.	12%	25%	23%	12%	28%	20%	50%	7%	11%	13%

*p< .05

Professional Development Results Summary

Item Description	Science Teachers					Administrators				
At my school, I believe Nevada science standards...	% A	% SA	% N	% SD	% D	% A	% SA	% N	% SD	% D
# 13* are used to design science professional development programs.	16%	36%	23%	11%	14%	36%	42%	15%	6%	2%
# 18 are understood by science teachers.	28%	31%	21%	15%	5%	29%	45%	11%	13%	4%
#19* are understood by administrators.	12%	25%	25%	23%	16%	27%	45%	7%	16%	5%
#21* encourage science teachers to promote professional dialogue among them.	14%	32%	18%	22%	14%	25%	54%	18%	18%	4%
#31* promote group development among science teachers.	15%	28%	30%	16%	11%	20%	56%	16%	7%	0%

*$p<.05$

Curriculum Results Summary

Item Description	Science Teachers					Administrators				
At my school, I believe Nevada science standards...	% A	% SA	% N	% SD	% D	% A	% SA	% N	% SD	% D
# 1* have established common expectations to guide curriculum development.	34%	39%	15%	9%	3%	52%	38%	9%	2%	0%
# 14* match our goals for what we want and expect from science curricula.	16%	33%	20%	19%	13%	32%	46%	13%	5%	4%
#15* guide our goals for what we want and expect from science curricula.	21%	40%	17%	12%	10%	48%	34%	11%	5%	2%
#20* are a priority.	23%	36%	18%	16%	8%	36%	46%	11%	4%	4%
#23* have been implemented in to our science curricula.	42%	39%	11%	6%	2%	43%	54%	4%	0%	0%
#28* have improved the pre-existing curricula.	9%	35%	24%	16%	16%	34%	38%	20%	5%	4%
#30* are aligned with current science curricula	24%	38%	23%	9%	6%	30%	57%	5%	4%	4%

*$p < .05$

Supervision Results Summary

Item Description	Science Teachers					Administrators				
At my school, I believe Nevada science standards...	% A	% SA	% N	% SD	% D	% A	% SA	% N	% SD	% D
# 11* are used to assist teacher supervision in science classrooms.	7%	23%	25%	23%	22%	20%	40%	22%	11%	7%
# 12* are discussed during teacher evaluation conferences.	14%	23%	15%	20%	29%	33%	35%	11%	11%	9%
#24* are used to supervise teacher performance.	11%	26%	29%	20%	14%	13%	47%	27%	7%	6%
#26* have had a positive impact on classroom supervision.	6%	16%	33%	21%	24%	15%	38%	36%	6%	6%

*$p < .05$

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